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ESG scores and its influence on firm performance: Australian evidence

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ESG Scores and its Influence on Firm Performance: Australian Evidence[1]

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Abstract

The paper presents the impact of ESG (environmental, social and governance) practices on the financial performance of companies listed in Australian Securities Exchange. ESG scores for 2008 to2010 are derived from the research work conducted by Corporate Analysis Enhanced Responsibility (CAER). Financial performance is measured using a range of financial ratios to capture profitability and equity valuation. Our results show that correlation between financial performance and ESG scores is weakly positive, including both 1-year and 2-year lag analyses. We also find a weak negative association between errors in analyst forecasts and ESG scores. Contrary to our expectations, portfolio returns of ESG leaders are found to be lower compared with ESG laggards. One possible suggestion of the weak results is that ESG scores do not inform sufficiently about the true sustainability practices that provide a flow-on effect to firm performance.

Keywords: ESG, corporate social responsibility, financial performance, portfolio returns and analyst forecast

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1. Introduction

Corporate social responsibility is a concept whereby companies integrate social and environmental concerns in their business operations and in their interaction with stakeholders on a voluntary basis (European Commission, 2001). This is commonly demonstrated by companies through the preparation of some form of sustainability reports. The sustainability report could be a stand-alone report, or a section covering or integrating social and environmental dimensions in the annual report. Some sustainability issues addressed by companies may also be reported on the company's website. There is no consensus on the definition of sustainability (for example, Constanza and Patten, 1995; Pope et al., 2004; Bell and Morse, 2003) and attempts by many writers to come up with an operational definition have made the term ambiguous. Typically, sustainability is used interchangeably with the term sustainable development and the latter is broadly defined in the Brundtland Report, 1987 as *"development that meets the needs of the present without compromising the ability of future generations to meet their own needs"*. In recent decades, there are attempts to particularise this definition, including the triple bottom line concept of Elkington (1998) covering economic, social and environmental pillars. More recently, a growing number of institutional investors promoting socially responsible investing (SRI) require use of ethical screening in their stock selection processes. As a result, companies are pressured to not only address analysts concerns on financial performance issues but also environmental, social and governance concerns, now widely referred to as ESG.

In this paper, companies with good sustainability practices include those that address ESG issues that are materially relevant to its stakeholders and integrate some of these dimensions in their core business strategies. This is contrary to Friedman's capitalist view that "*corporate managers' only moral obligation is to its shareholders and that the only one social responsibility of business is to use its resources and engage in activities designed to increase its profits as long as it stays within the rules of the game, which is to say, engages in open and free competition, without deception or fraud"* (1962, p. 133).

While there is a wide-held belief that integrating sustainability practices into companies will improve company performance, support for this view comes largely from qualitative surveys (for example Maier, 2007; Boston College Centre for Corporate Citizenship, 2009; Ernst and Young, 2002; KPMG, 2005), many of which are not rigorously carried out, and tend more to

be based on opinion. Hence, there is need for a rigorous study examining the relationship between the level of sustainability practices and firm performance.

Existing research, exploring the impact of sustainability practices on the overall performance of companies, largely focuses on individual criteria of ESG rather than taking a holistic view (see for example, Clarkson et al., 2008; Polloe, 2010; Benito and Benito, 2005). As well, company performance tends to be narrowly defined (Abramson and Chung, 2000; Brammer et al., 2006; Gompers et al., 2003; Statman, 2000; Cortez et al., 2009; Edmans, 2007; Oehri, 2008; Olsson, 2007), rather than incorporating a wide range of financial ratios to provide a good and accepted benchmarking of a company's financial performance, characteristics and credentials (Barnes, 1987; Balatbat et al., 2010).

This paper is motivated by the lack of academic research on the relation between ethical and sustainability practices and firm performance, particularly in Australia where mainstream investors are taking steps toward ESG integration in their investment decision processes. This is demonstrated by the growing number of Australian signatories to the UNPRI[2] with global assets under management of approximately US$876 billion (RIAA, 2011). Despite the mainstreaming of ESG analysis in Australia, large data providers such as Bloomberg and KLD Research and Analytics (now part of MSCI) only track the ESG performance of large Australian companies that are part of the S&P Index. In this paper, we utilise ESG scores prepared by Corporate Analysis Enhanced Responsibility (CAER), the Australian research branch of UK based Ethical Investment Research Services (EIRIS). EIRIS is not-for-profit global provider of independent research into ESG performance of companies. This database allowed us to perform an empirical assessment of the ESG practices among the top 300 listed companies in the Australian Securities Exchange (ASX) for the period 2008-2010. We examine the link between firm performance and ESG scores, where firm performance encompasses both accounting and market performance, and is represented by profitability ratios, consisting of five measures, and equity valuation, consisting of seven measures. We also investigate firm performance via analysis of portfolio returns and analyst forecasts.

[2] United Nations Principles of Responsible Investment (UNPRI) promotes six principles and broadly state that "... institutional investors have a duty to act in the best long-term interests of our beneficiaries. In this fiduciary role, we believe that environmental, social, and corporate governance (ESG) issues can affect the performance of investment portfolios (to varying degrees across companies, sectors, regions, asset classes and through time)". See http://www.unpri.org/principles/ for details of the Principles for Responsible Investment

The paper is of interest to practitioners, academics and policy makers looking at whether ESG practices influence firm financial performance. Based on the analysis across different industry sectors, the best and worst performing industry sectors can be compared in terms of socially responsible practices. The analysis also permits benchmarking across individual companies. From the correlation analysis, the worth of investing in ESG practices can be assessed, though it should be cautioned that evidence so far indicate that different metrics used to represent both ESG and financial performance can result in different conclusions (Poelloe, 2010; Abramson and Chung, 2000, Derwall et al., 2004, Gompers et al, 2003, Opler and Sokobin, 1995, and Orlitzky et al., 2003, Bauer et al., 2006; Hamilton et al, 1993; Angel and Rivoli, 1997).

The remainder of the paper proceeds with an outline of the empirical study undertaken, discussion of the data sample, component industry sectors, and research methodology. Then the core findings of the research are presented in five parts: I. Cumulative frequency plots of ESG scores as well as quartile comparisons across industry sectors. II. Correlation between financial performance and ESG scores for all companies combined and for each industry sector. III. A multi-linear regression analysis on the relationship of other company factors such as size, leverage and growth on ESG scores. IV. Portfolio analysis of ESG leaders and laggards. V. Accuracy of analyst forecasts. The conclusions and a discussion of the potential for future research follow.

2. Literature Review and Hypotheses Development

Different views exist on socially responsible practices and investing.

(i) Some authors argue that ethical portfolios tend to underperform over the long term due to lack of diversification (Markowitz, 1952) and that the extra cost, that is involved in screening, negatively impacts the net return (Bauer et al., 2006; Hamilton et al, 1993; Angel and Rivoli, 1997). Angel and Rivoli (1997) argue that the exclusion of companies is considered a form of market segmentation; based on finance theory the effect of this is an eventual rise in the cost of equity capital due to a lack of demand from socially responsible investors, and this in turn decreases the profit associated with the company's activities. Empirical studies such as that conducted by Poelloe (2010) found social responsibility to be negatively correlated with financial performance. Evans and Peiris (2010) also found that a

company's involvement in more general social issues contributed negatively to both operating performance and stock return. Manescu (2011), based on US data from July 1992 till June 2008, suggests that the only positive effect found between one ESG criterion (community relations) on risk-adjusted stock returns could have most likely been attributed to mispricing rather than a compensation for risk, further arguing against the existence of any positive correlation between sustainability practices and market performance.

(ii) An opposing view is that ethical investing has a positive impact on the bottom line of an organisation and market performance. Support for this view comes from Abramson and Chung (2000), Derwall et al. (2004), Gompers et al. (2003), Opler and Sokobin (1995), and Orlitzky et al. (2003). Abramson and Chung (2000) argue that it is possible to create a consistently diversified subset of value stocks, and that socially responsible investors may not necessarily just pick stocks limited to socially responsible indices but may select other attractive value stocks, outside of these indices, which may qualify as being 'socially responsible' depending on each investor's own parameters. They find that risk-adjusted returns might actually be improved by having more stringent stock selection and applying active industry sector weightings. The meta-analysis of Orlitzky et al. (2003), across 52 studies using data for the period 1972-1997, found that there is a positive association between corporate social practices and financial performance. More recently, Bnouni (2010) demonstrates a positive relationship between CSR and financial performance does not just take place in large organisations, but also across 80 French small and medium sized enterprises (SMEs). Some research investment reports (Briand et al., 2011; RIAA, 2011) support this view. Briand et al. (2011) reason that one of the common motivations for integrating ESG into the investment process is to actively manage key drivers of risk and returns. For example, climate change is expected to cause volatility in commodity prices stemming from drastic changes in weather patterns, and hence companies that are able to demonstrate forward-looking strategies are more likely to have a competitive advantage over laggards who may suffer unanticipated costs. Thus, including ESG in investment decisions is considered a form of good risk management.

(iii) A third neutral school perceives that ethical and non-ethical investing yield similar results and that there is no real differentiation between them. Support for this view can be found in Kreander et al. (2005), Scholtens (2005), Hoepner et al. (2011) and Gregory and Whitaker (2007).

A summary of findings up until 2009 is contained in a joint report published by Mercer and the Asset Management Working Group of the United Nations Environment Programme Finance Initiative (Mercer and UNEP FI AMWG, 2007). The report examines a total of 36 studies, selected on the basis that they were either published in peer-reviewed journals, provided a variety of different ESG factors under review, or were considered influential in widening the application of traditional finance theory to non-financial factors. While a majority (55.5%) of these studies exhibit a positive relationship between financial performance and ESG factors, it is interesting to note that only a small proportion (22.2%) have an equal focus in all three areas of ESG.

Much of the existing literature targets the analysis of the effects of corporate social responsibility on portfolio performance (Abramson and Chung, 2000; Brammer et al. , 2006; Gompers et al., 2003; Schroder, 2004; Statman, 2000; Cortez et al., 2009; Edmans, 2008; Oehri and Faush, 2008; Olsson, 2007). Most studies have used data primarily from the US and Europe in deriving their conclusions. Wanderley et al. (2008) find that the country of origin has a stronger influence than industry sector, suggesting that CSR activities could be influenced by political culture, socioeconomic situations and legislation. There appears to be only one existing study which has explored this area of research solely based on Australian data; however, the measurement used for CSR is restrictive; a value of one is used if a company has adopted CSR, and zero is used if it has not (Brine et al., 2007). Such a measurement is merely on the existence of CSR, and not an exploration of its extent.

Stakeholder theory (Donaldson and Preston, 1995) is used to formulate the hypotheses tested in this paper. Based on this theory, the satisfaction of stakeholders is assumed to be pivotal to achieving good financial performance. Hill and Jones (1992) elaborate on how the management of stakeholder relationships might act as a monitoring tool to help managers focus on financial goals (Orlistzky et al., 2003). Freeman and Evan (1990) claim that high company performance is dependent on the prioritisation of multiple stakeholder interests. This implies that while similar interests may exist between stakeholders, there may also be occurrences where potential conflicts may arise between them and good coordination of differing interests is believed to yield better company performance. Accordingly, it is suggested that the satisfaction of multiple stakeholder interests in a company is imperative in order to ensure good company performance, and that a non-conflicting interest across all

stakeholders is a genuine concern for ethical or responsible practices. In other words, companies are expected to integrate socially responsible practices into their day-to-day operations.

The interest of investors in socially responsible practices can be seen through the survey results of Maier, 2007. This survey examines the value of ESG issues on companies and found that 90% of investors (consisting of mainstream and socially responsible asset managers, pension and church funds around the world) believed that ESG issues would have some financial impact on the value of companies over the short to medium term (3-5 years). This survey suggests that if companies are able to manage ESG issues well, then better financial performance should follow.

It is accordingly conjectured in this paper that if companies are committed to satisfying multiple stakeholders' interests, companies will give attention to improving sustainability practices; this in turn is anticipated to be reflected in higher ESG scoring and better financial performance. Consequently, a strong positive correlation could be expected between the financial performance of companies and ESG scores. This argument leads to the paper's first hypothesis:

Hypothesis 1: Firm performance is positively correlated with ESG scores, across industry sectors.

A study conducted by Deloitte, CSR Europe and EuroNext (2003), which surveyed about 400 mainstream fund managers and financial analysts, shows that approximately 80% of the respondents claim social and environmental management to have a positive impact on a company's market value in the long term, while 50% indicate that they use CSR information provided by management. Dhaliwal et al. (2011) have also found that the issuance of CSR reports is positively associated with the accuracy of analyst forecasts. However, currently missing in this research is evidence of studies focussing on the impact of ESG performance on the accuracy of earnings forecast. This needs to be explored due to its possible implications. If in fact the accuracy of earnings forecast increases due to better ESG performance, companies may be more motivated to focus on improving their sustainability practices and reporting knowing that such information may be used by analysts in gauging the performance of their companies. In this paper, it is anticipated that earnings forecast

accuracy will be better for companies with better ESG performance. Better ESG performance is assumed to proxy for better management, and analysts are expected to incorporate this into their analysis increasing the accuracy of their ability to forecast earnings. This leads to the paper's second hypothesis:

Hypothesis 2: ESG scores are negatively associated with analyst forecast errors.

3. Data and Research Methods

3.1 Sample selection

Our sample is derived from a list of top 300 companies listed on the Australian Securities Exchange and each company is assessed whether its ESG practices is tracked by CAER(EIRIS) for the three-year period 2008-2010.[3] We are not aware of any published research using this database except for Brammer et al (2006), a study that examines the relation between corporate social performance and stock returns of UK companies. There may be a few more papers that use the EIRIS but only examine the environmental (E) dimension as opposed to ESG (Hoepner et al, 2011). As mentioned above, other commonly used database were not utilised in this study due to the limited coverage of Australian firms at the time of our study. After filtering the sample for data availability, we were able to obtain data for 208 companies from the following sectors: construction (8%); banking and financial services (11%); oil and gas producers (10%); mining (19%); general retail (7%); industrial (14%); media (6%); food and beverage (5%); energy and utilities (7%); support services (9%); and travel and leisure (4%). This data set is used throughout the analysis in this paper.

3.2 ESG score

EIRIS developed a framework based on three dimensions: social, environmental and governance to evaluate risks and opportunities confronting industry sectors. EIRIS scores companies by assigning points or values, which can be either positive or negative. The scoring mechanism uses an ordinal scale, where 3 represents a high positive and -3 represents a high negative for the listed criteria. CAER adopts a similar scoring process for assessing the ESG scores of Australian companies. Collectively, there are 87 criteria spanning across the

[3] Although, CAER has prepared ESG scores for Australian companies since 2005, the dimensions covered were incomplete and therefore we were unable to make sensible comparisons using a longer time period.

environmental, social and governance dimensions addressing pertinent issues, which are of primary concern to stakeholders. Use of all 87 criteria is not advisable as it will not provide a realistic ESG score and will be difficult to interpret. We used 26 criteria (refer to Appendix A for the list and explanation) which we believe are general indicators of ESG practices. Focusing on general indicators as opposed to including industry specific indicators allowed us to make sensible comparisons between companies across different sectors.

3.3 Methodology

Hypothesis 1 is tested through: a one-to-one correlation analysis between various financial ratios and ESG scores; a multi-linear regression analysis; and an examination of the returns and variances of the portfolios of ESG leaders (defined as the group of companies that have achieved improvement or consistent ESG scores over the period 2008-2010) and ESG laggards (defined as the group of companies that have deteriorated ESG scores over period 2008-2010).

To depict the proportion of companies achieving a certain ESG score, cumulative frequency distributions and their associated quartile values are developed from the EIRIS data. This permits benchmarking across industry sectors.

The strength of the correlation between financial performance and ESG scores is tested. Financial performance indicators include profitability financial ratios and equity valuation (Barnes, 1987) and are obtained from AspectHuntley *FinAnalysis*. A total of 12 financial performance indicators are used in this paper namely:

(1) Profitability (5 measures):

- Return on assets (ROA)
- Return on equity (ROE)
- Return on invested capital (ROIC)
- Earnings before interest tax depreciation and amortisation (EBITDA) margin
- Net operating profit less adjusted taxes (NOPLAT)

(2) Equity Valuation (7 measures):

- Earnings per share (EPS)
- Dividend per share (DPS)

- Dividend yield (DY)
- Price to earnings ratio (PER)
- Enterprise value (EV)
- Market capitalisation to trading revenue (MC/TR) ratio
- Price to book value (P/BV)

Appendix B lists the formulae used for these indicators.

For the portfolio analysis, portfolio return is defined in three ways:

(a) Stock return. Daily stock return given by:

$$\log_e\left(\frac{price_x}{price_y}\right) \tag{1}$$

where x represents the daily closing price and y represents the daily opening price of a stock. The annual stock return is obtained by adding the daily stock returns for all trading days in a particular year.

(b) Buy-and-hold return (BHR) given by:

$$\mathrm{BHR}(t_1, t_x) = (\log P_x - \log P_1) \tag{2}$$

where the subscript x represents the last trading day of the month, 1 the first trading day of the month, and P the stock price. To obtain the annual return, the monthly buy-and-hold returns are summed.

(c) Arithmetic return (AR). Daily arithmetic return is given by:

$$D = 100 \times \frac{\mathrm{price}_n - \mathrm{price}_{n-1}}{\mathrm{price}_{n-1}} \tag{3}$$

where n = 2, 3, ..., n_x represents the n^{th} data value in days, and n_x is the last trading day of the year.

The average daily return for a company is annualised through,

$$\text{Annualised return} = (1 + D)^{365} - 1 \tag{4}$$

Companies in each portfolio (ESG leaders and ESG laggards) are weighted equally. The return of a portfolio is determined from,

$$\text{Return} = \sum_{i} w_i R_i \qquad (5)$$

where i represents the number of companies in a portfolio, w represents the weight of a stock and R represents the expected return on stock.

In testing hypothesis 2, we examine whether the ability of analysts to forecast earnings are improved by knowledge of the risks and opportunities (proxied by ESG scores) confronting companies. Following Dhaliwal et al. (2012), we use analyst forecast error to proxy for this. Forecast error, denoted by FERROR, is defined as the average of the absolute errors of all forecasts made in the year for target earnings, scaled by the stock price at the beginning of the year and is given by,

$$\text{FERROR} = \frac{1}{N}\sum \frac{1}{\text{Price}_{i,t}} \left| \text{FC}_{i,t,j} - \text{EPS}_{i,t} \right| \qquad (6)$$

where subscripts *i, t*, and *j* denote firm, year and forecast, respectively; FC denotes earnings forecast; and Price denotes stock price at the beginning of the year. The absolute error is found by reducing FC within a specified horizon (j) of a particular firm (i) in a given year (t) by the actual EPS value for a particular firm (i) in the same year (t). The absolute error for firm (i) is then divided by its respective stock price at the beginning of the year. Absolute errors for the firm (i) are summed and divided by the total number of forecasts made to obtain FERROR. Both FERROR and EPS are obtained from the I/B/E/S database for the period 2008 to 2010 to ensure consistency in data. We also examine both one-year and two-year horizon forecasts because forecast errors tend to get larger as the forecast horizon increases (De Bondt and Thaler, 1990). Forecast error and EPS are both obtained from the I/B/E/S database for the period 2008 to 2010. This is done to ensure consistency in the data.

4. Results

4.1 Cumulative frequency plots and quartile comparisons across industry

Figure 1 shows a comparison of ESG scores across all industry sectors. The worst performing industry sectors are oil and gas and mining throughout the period 2008-2010, where a relatively high proportion of companies in those industry sectors achieved mostly negative ESG scores. The industrial, energy and utilities and construction industry sectors also ranked low in terms of ESG scores consistent with Maier, 2007 that these sectors have the most

pertinent ESG issues (Maier, 2007). This result is anticipated because these sectors are labelled with the '3D' image (Dirty, Difficult and Dangerous) (ILO, 2001). The banking and financial services industry sector clearly outperforms the other industry sectors. The maximum ESG score recorded for all industry sectors throughout the three-year study period, using the same pool of companies, was 46 while the minimum score was -23.

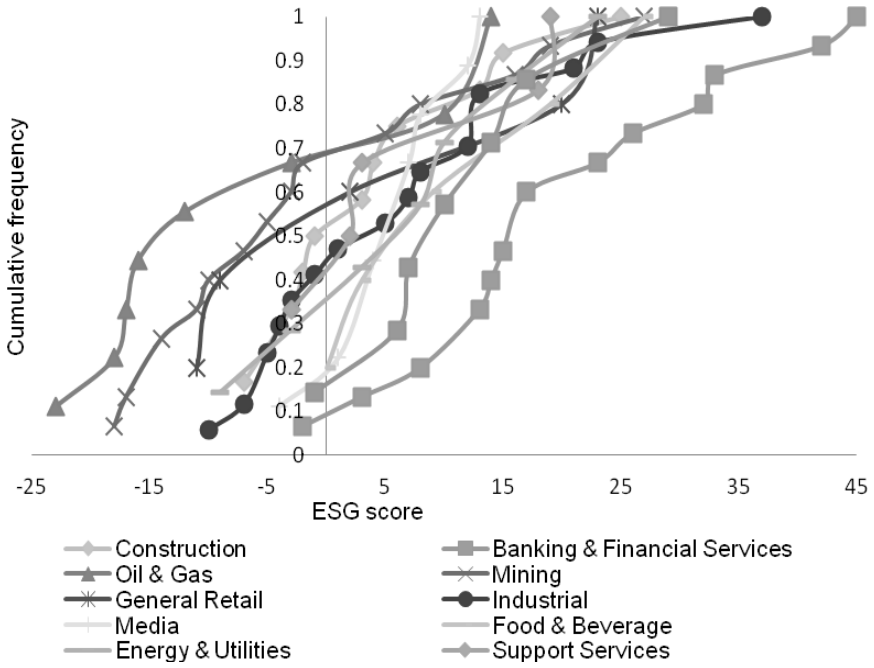

Figure 1a. Cumulative frequency plots of ESG 2008 scores by industry sector.

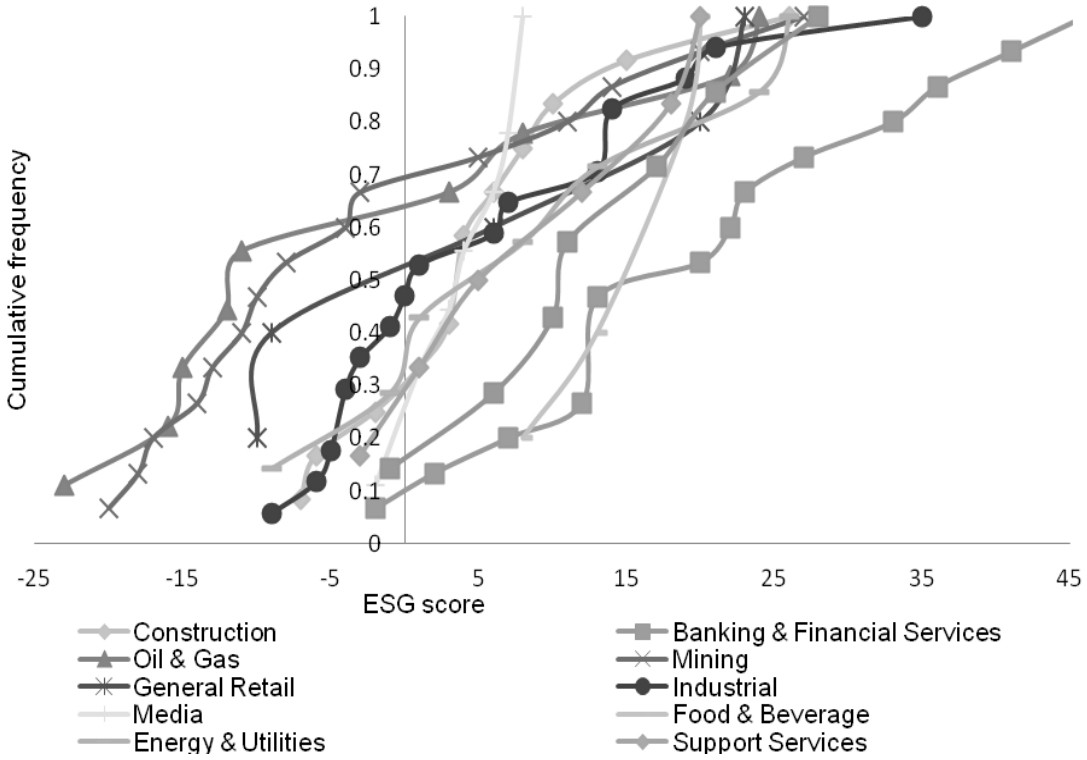

Figure 1b. Cumulative frequency plots of ESG 2009 scores by industry sector.

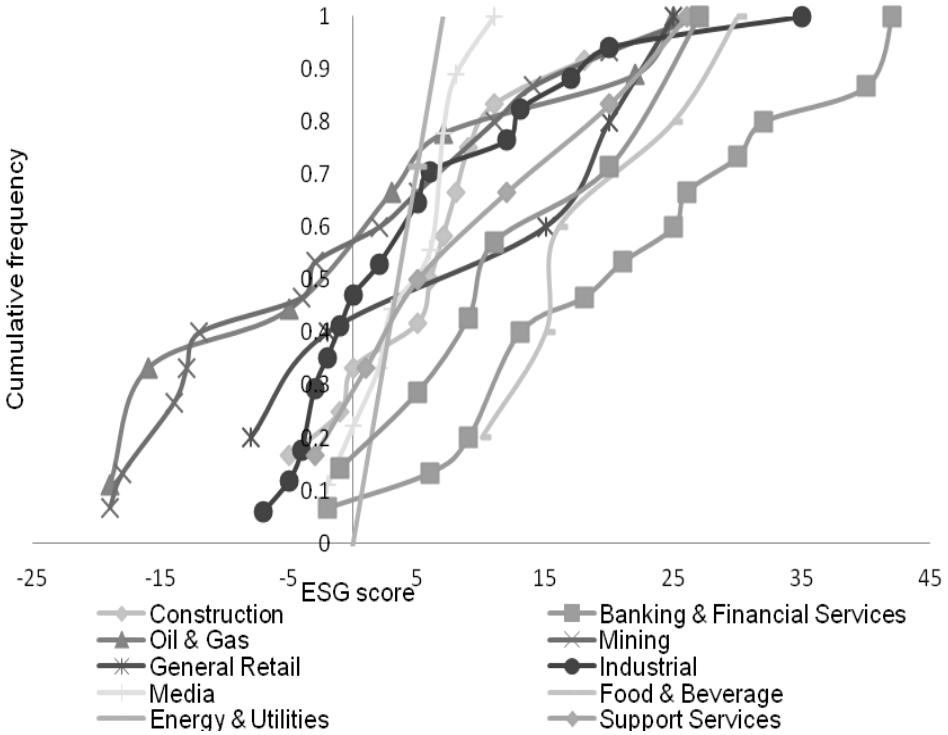

Figure 1c. Cumulative frequency plots of ESG 2010 scores by industry sector.

Table 1 shows the quartile comparisons (25%, 50%, and 75%) across industry sectors for the period 2008-2010. The banking and financial services sector scores the highest median (50% quartile) at 17, 20 and 21 for 2008, 2009 and 2010 respectively, while the oil and gas sector has the lowest median at -12 and -11 for both 2008 and 2009, but shows improvement in 2010 with a median score of 3. The oil and gas sector also has the lowest quartile score at -18 in 2008. There appears to be a general improvement in the ESG scores across the three year period for all industry sectors with the exception of travel and leisure.

Industry sector	**Quartiles (2008)**			**Quartiles (2009)**			**Quartiles (2010)**		
	25%	50%	75%	25%	50%	75%	25%	50%	75%
Construction	-3	1	11	-1.3	4	9.5	-0.8	6.5	10.5
Banking and financial services	13	17	32	12	20	33	13	21	32
Oil and gas	-18	-12	12	-15.5	-11	15	-16	3	14.5
Mining	-14	-5	8	-14	-8	11	-14	-3	11
General retail	-10	2	22	-9.5	6	21.5	-5	15	22.5
Industrial	-5	5	13	-4	1	14	-3	2	12.5
Media	3	7	10	1	4	7.5	1	6	7.5
Food and beverage	2	9	23	10.5	19	19.5	12.5	16	27.5
Energy and utilities	-3	8	16	-1	8	24	-1	14	23
Support services	-3	3	18	0	8.5	19.5	0	8.5	21.5
Travel and leisure	6	10	17	6	11	21	5	11	27

Table 1. Quartile ESG scores by industry sector.

4.2 Correlation coefficients

Chand (2006) suggests that distinguishing by industry type allows for clearer analysis to be made between CSR and financial performance. In Table 2 negative values are in parentheses; negative values indicate that as the ESG score decreases, financial performance increases, and vice versa. The p-value is an indicator of the decreasing reliability of the result. That is, the higher the p-value, the less can it be believed that the observed relation from the sample between the variables is a reliable indicator of the relation between the respective variables in the population (Hill and Lewicki, 2006).

Industry sector	ROE	ROA	ROIC	EBITDA	NOPLAT
Construction	(0.05)	(0.11)	0.08	**(0.21)****	**(0.23)***
Banking and financial services	**(0.18)****	(0.13)	**0.19****	0.01	0.07
Oil and gas producers	0.09	0.016	0.04	(0.005)	0.39
Mining	**0.14****	0.12	0.12	**0.16****	**0.16****
General retail	(0.12)	**(0.31)***	0.04	0.07	0.09
Industrial	(0.18)	0.05	(0.05)	(0.12)	(0.10)
Media	0.09	**0.35***	**(0.32)****	(0.19)	(0.19)
Food and beverage	**0.71***	**0.67***	**0.41****	**0.49****	**0.45***
Energy and utilities	0.16	0.15	0.27	0.06	0.07
Support services	**(0.37)****	(0.45)	(0.35)	(0.52)**	(0.48)*
Travel and leisure	(0.12)	(0.17)	0.13	(0.16)	(0.18)

Table 2a. Correlation coefficients by industry sector - Profitability ratios. (* p-value < 0.1; ** p-value < 0.05)

Industry sector	EPS	DPS	DY	PER	EV	MC/TR	P/BV
Construction	**0.54***	**0.29***	**(0.27)***	0.02	**0.27****	0.18	0.00
Banking and financial services	**0.24****	**0.23****	(0.07)	**0.27***	**0.77***	0.06	0.19
Oil and gas producers	**0.58***	**0.62***	0.18	0.02	**0.64***	(0.01)	(0.10)
Mining	**0.16***	**0.48***	**(0.30)****	0.08	**0.52***	**(0.16)****	0.04
General retail	**0.34****	**0.46***	0.02	0.18	**0.58***	0.03	(0.05)
Industrial	**0.24***	0.32	(0.05)	(0.18)	(0.01)	**(0.30)***	0.14
Media	**0.37***	(0.17)	**0.44***	**0.31****	**(0.55)***	**(0.36)***	0.07
Food and beverage	0.17	**0.46****	**0.50****	0.23	**0.54***	0.25	**0.67***
Energy and utilities	**0.57***	(0.13)	0.00	(0.10)	**0.61***	**(0.67)***	0.05
Support services	0.19	**0.39***	(0.11)	0.35	**0.43***	(0.33)	(0.17)
Travel and leisure	(0.05)	0.09	0.37	0.04	**0.83***	(0.31)	(0.26)

Table 2b. Correlation coefficients by industry sector; equity valuation. (* p-value < 0.1 p-value < 0.05)**

Collectively there is no strong positive relation between ESG scores and profitability except for the mining and food and beverage sectors. A positive linear trend between equity

valuation performance measures and ESG scores are observed in EPS, DPS and EV performance measures.

Commentary by industry sector follows. Two related symbols are used here:

r correlation coefficient; r provides an indication of the direction and magnitude of correlation.

r^2 coefficient of determination; r^2 provides an indication as to how much variation in one variable can be accounted for by variation in the other variable.

Construction

From Table 2a, it can be observed that there is weak negative correlation ($r < 0.5$) with the profitability ratios except for ROIC where $r = 0.08$. The coefficient of determination (r^2) is less than 0.5 for all the measures; that is less than 50% of the variation in a company's bottom line can be explained by variation in its ESG score. Hence, there is not enough evidence to justify the claim that there is strong positive correlation between profitability and ESG scores within the construction sector. Under equity valuation, the analysis shows that EPS has a strong correlation with ESG score where $r = 0.54$ and is statistically significant at p-value < 0.1, while all the remaining six measures exhibit a weak correlation with ESG scores, although four (DPS, $r = 0.29$;PER, $r = 0.02$; EV, $r = 0.27$; MC/TR, $r = 0.18$) of these suggest an increasing trend line. Hypothesis H1 (for the construction sector) is therefore rejected.

Banking and Financial Services

EV exhibits a reasonable positive correlation ($r > 0.5$) with ESG score and is statistically significant (p-value < 0.1). The remaining ratios from Tables 2a and 2b have weak correlation with ESG score, though generally positive, except for ROE, ROA and DY. Both EPS and DPS are positively correlated to ESG scores and are statistically significant at a p-value < 0.05. Hypothesis H1 (for the banking and financial services sector) is therefore rejected.

Oil and gas

A positive trend ($r > 0$) is observed, with all profitability ratios used except for EBITDA, though the correlation coefficients are too small to support any strong relationship. Analysing the coefficients for the equity valuation measures and ESG score, a reasonable positive correlation is observed for EPS ($r = 0.58$, p-value < 0.1), DPS ($r = 0.62$, p-value < 0.1) and

EV($r = 0.64$, p- value < 0.1). This gives r^2 values of 0.34, 0.38 and 0.41 indicating that approximately 34% of the variation in data for EPS, 38% of the variation in data for DPS and 41% of the variation in data for EV can be accounted for by variation in the ESG score.

Strong and sustained EPS values might be anticipated because the oil and gas sector could be expected to have large market capitalisation and possibly strong market dominance (Financial Times, 2007). However EPS performance for this particular dataset is found to be poor compared to other industry sectors. The ESG scores for this sector are also found to be poor, with companies having both low EPS values and low ESG scores influencing the correlation.

Since a large majority of the measures show weak correlation ($r < 0.5$) with ESG score, hypothesis H1 (for the oil and gas sector) is rejected.

Mining

The relationships between all profitability ratios and ESG scores show positive linear trends. No strong correlation is found across all the financial ratios used ($r < 0.5$) except for EV. Both EPS and DPS are positively correlated to ESG score and are found to be statistically significant, with $r = 0.16$ (p-value < 0.1) and $r = 0.48$ (p-value < 0.1) respectively. Nevertheless, considering the generally weak correlations across all measures, hypothesis H1 (for the mining sector) is rejected.

General retail

ROE and ROA are found to have a negative correlation with ESG score where the correlation coefficients involving both ROE and ROA are -0.12 and -0.31 respectively. The correlation is not strong when equity valuation measures are used (EPS, $r = 0.34$; DPS, $r = 0.46$, DY; $r = 0.02$, PER; $r = 0.18$; MC/TR, $r = 0.03$; P/BV, $r = -0.05$) with the exception of EV where $r = 0.58$ and this is statistically significant (p-value < 0.1). Hypothesis H1 (for the general retail sector) is rejected.

Industrial

For all twelve measures, there is no strong correlation with ESG score. Of the measures, eight show a negative relationship with ESG score (ROE, $r = -0.18$; ROIC, $r = -0.05$; EBITDA, $r = -0.12$; NOPLAT, $r = -0.10$; DY, $r = -0.05$; PER, $r = -0.18$; EV, $r = -0.01$ MC/TR, $r = -0.30$) while the others show a positive relationship with ESG score but have

correlation coefficients less than 0.5. Therefore hypothesis H1 (for the industrial sector) is rejected.

Media

Based on Tables 2a and 2b, it is clear that none of the correlation coefficients are strong enough to justify a positive link with ESG score. Six out of the twelve measures exhibit a negative relationship (ROIC, r = -0.32; EBITDA, r = -0.19; NOPLAT, r = -0.19; DPS, r = -0.17; EV, r = -0.55; MC/TR, r = -0.36). Consequently, hypothesis H1 (for the media sector) is rejected.

Energy and utilities

No strong correlation is found between profitability ratios and ESG scores. For equity valuation measures, it is found that only EPS and EV depict a reasonable correlation (r = 0.57 and r = 0.61 respectively) and are statistically significant at p-value < 0.1. Hence, hypothesis H1 (for the energy and utilities sector) is rejected.

Food and beverage

A reasonable positive correlation exists between all the profitability ratios (ROE, r = 0.71; ROA, r = 0. 67; ROIC; r = 0.41; EBITDA, r = 0.49; NOPLAT, r = 0.45) and ESG scores. However, looking at r^2, in only two of the ratios, ROE (0.50) and ROA (0.45), variability can be largely accounted for by variation in ESG scores. All the trend lines between equity valuation measures and ESG score depict a positive gradient, but a large majority only show a reasonable positive relationship, except for DY (r = 0.50), P/BV (r = 0.67) and EV (r = 0.54). Consequently, since 60% of the indicators depict a reasonable correlation with ESG, hypothesis H1 (for the food and beverage sector) is accepted.

Support services

When profitability ratios are examined, all show a negative correlation with ESG scores (ROE, r = -0.37; ROA, r = -0.45; ROIC, r = -0.35; EBITDA, r = -0.52; NOPLAT, r = 0.48). The results for both EBITDA and NOPLAT are statistically significant at a p-value < 0.1. Hypothesis H1 (for the support services sector) is therefore rejected.

Travel and leisure

Generally a negative trend line is observed between profitability ratios and ESG score, with the exception being ROIC. No strong link can be established because of the weak correlation coefficients. The conclusion is similar for equity valuation measures, with the exception of EV ($r = 0.83$, $r^2 = 0.68$) suggesting that 68% of the variation in EV values can be accounted for by variation in ESG scores. Because EV is the only ratio that demonstrates a reasonable relationship with ESG, hypothesis H1 (for the travel and leisure sector) is rejected.

4.3 Multi-linear regression

Although there is no strong correlation than can be established in our univariate tests by industry sectors, the relationship may be better explained together with other predictors (namely size, growth and leverage) of firm performance (Guidara and Othman, 2011, Jia et al., 2010). This relationship is captured in the following model:

$$\text{FinPerf} = \beta_0 + \beta_1 \text{ESG} + \beta_2 \text{Size} + \beta_3 \text{Growth} + \beta_4 \text{Leverage} + \beta_5 \text{Industry} + \varepsilon \qquad (7)$$

where β_i, i = 0, 1, … are constants, and the variables in Equation (1) are described below:

'FinPerf' is financial performance as measured by financial ratios as described in Appendix 2.

'Size' is the logarithm of total assets. A positive relationship is anticipated between firm size and financial performance.

'Growth' is EPS 1 year growth. Strong earnings growth leads to better financial performance. Hence a positive relationship might be anticipated.

'Leverage' is net gearing. A negative relationship might be anticipated between leverage and financial performance; higher gearing ratios indicate that the company is in a less favourable financial position because most activities are funded through borrowings.

'Industry' is a dummy variable related to each industry sector.

The results of the multi-linear regression show all beta coefficients for ESG are positive except for ROA, EBITDA, NOPLAT, DY, and PER. Notably, EV is the only measure of financial performance showing statistical significance against ESG scores and the results are reported in Table 3. The r value of the EV model is 0.59 ($p < 0.05$) while the adjusted r^2 value is 0.34.

For sensitivity tests we also examined the E, S and G scores separately and experimented on different weightings for the ESG scores but the results do not significantly differ from what is already reported.

Variable	**Un-standardised coefficients**		**Standardised coefficients**	**t**	**p-value**
	β_i	**Std. error**	β_i		
(Constant)	-1.29E11	1.466E10		-8.795	0.000
ESG	3.655E8	1.042E8	0.169	3.507	0.001
Size	1.637E10	1.630E9	0.501	10.042	0.000
Leverage	-2.429E9	1.213E9	-0.094	-2.003	0.046
Growth	6.371E7	1.422E8	0.018	0.448	0.654

Table 3. EV used as a measure of financial performance.

4.3.1 Lag analysis

Any new company initiative or implementation could be expected to take time to manifest and be reflected on financial performance. On this basis, it is anticipated that a lag effect might more accurately capture the impact of ESG on firm performance. The following model is examined:

$$\text{FinPerf}_{2009} = \beta_0 + \beta_1 \text{ESG}_{2008} + \beta_2 \text{Size}_{2009} + \beta_3 \text{Growth}_{2009} + \beta_4 \text{Leverage}_{2009} + \beta_5 \text{Industry} + \varepsilon \quad (8)$$

The meaning of the variables remains the same as in Equation (1), but the year of the data is now appended. All beta coefficients for ESG are positive except for NOPLAT, EBITDA, MR and DY, however only ROIC has ESG as a statistically significant variable. The model has an

adjusted r^2 of 0.083 (see Table 4). This analysis is also extended using two-year lag but the results are not statistically significant.

Variable	Un-standardised coefficients		Standardised coefficients	t	p-value
	β_i	Std. error	β_i		
(Constant)	-1.109	6.490		-0.171	0.865
ESG	0.236	0.058	0.373	4.054	0.000
Size	0.143	0.715	0.019	0.200	0.842
Leverage	-0.306	0.483	-0.065	-0.634	0.527
Growth	-0.006	-0.003	-0.003	-0.032	0.975

Table 4. ROIC used as a measure of financial performance; 1-year lag analysis.

4.4 Portfolio analysis

As explained above the sample is divided into two portfolios, namely ESG leaders and ESG laggards. ESG leaders are defined as a portfolio of companies with either consistent or improved ESG scores from 2008 to 2010; ESG laggards are defined as a portfolio of companies with deteriorated ESG scores across the same period. The portfolio returns are shown in Table 5.[4] Only BHR indicator shows that ESG leaders perform better than ESG laggards. This is a disappointing result for proponents of ESG integration as this suggests that it doesn't pay to invest in companies with good sustainability practices. It is however, unclear whether these results were affected by the global financial crisis.

Return type	ESG leaders	ESG laggards
Stock return	-0.063	-0.008
Buy-and-hold return (BHR)	-0.067	-0.085
Arithmetic return (AR)	0.010	0.107

Table 5. Portfolio Returns.

[4] We also used alternative definitions to define leaders and laggards (e.g. below and above median scores in the industry) and the results do not differ from what is reported in this paper.

The variance of both portfolios is also calculated. Portfolio variance is given as a function of the correlations ρ_{ij} of the individual stock, for all of the stock pairs (i,j) as shown in Equation (9), and may be taken as an indication of the return variability or return risk of a portfolio.

$$\text{Variance} = \begin{bmatrix} w_1\sigma_1 & \dots & w_n\sigma_n \end{bmatrix} \begin{bmatrix} 1 & \rho_{12} & \cdots & \rho_{1n} \\ \rho_{21} & 1 & \cdots & \rho_{2n} \\ \vdots & \vdots & \ddots & \vdots \\ \rho_{n1} & \cdots & \cdots & 1 \end{bmatrix} \begin{bmatrix} w_1\sigma_1 \\ \vdots \\ w_n\sigma_n \end{bmatrix} \quad (9)$$

The portfolio variances are shown in Table 6. The highest portfolio variance comes from the ESG laggards when BHR and the arithmetic return is used as a measure of portfolio performance.

Variance for:	**ESG leaders**	**ESG laggards**
Stock return	0.054	0.044
Buy-and-hold return (BHR)	0.068	0.111
Arithmetic return (A.R.)	0.309	0.615

Table 6. Portfolio variances.

4.5 Accuracy of analyst forecasts

The correlation results for forecast errors are shown in Table 7 for the one-year forecast horizon. Generally, a negative association is seen between FERROR and ESG scores, however only the food and beverage ($p < 0.05$) as well as the travel and leisure ($p < 0.1$) industry sector show statistically significant results, and this is only for the one-year forecasts. For the two-year forecast horizon (unreported for brevity) only the food and beverage sector shows a statistically significant result ($p < 0.05$).

Industry sector	**Correlation coefficient (r)**	**p-value**
Construction	-0.145	0.359
Banking and financial services	-0.064	0.724
Oil and gas producer	-0.195	0.276

Mining	-0.094	0.412
General retail	0.034	0.894
Industrial	-0.248	0.128
Media	-0.416	0.139
Food and beverage	**-0.592**	**0.016**
Energy and utilities	0.027	0.913
Support services	-0.060	0.827
Travel and leisure	**-0.416**	**0.086**

Table 7. Correlation coefficients between FERROR and ESG scores for one-year forecasts.

A multi-linear regression analysis by industry sectors for the period 2008 to 2010 is also done to capture whether forecast errors are reduced as a result of the company's good ESG practices. This relationship is estimated using the following model:

$$\text{FERROR} = \beta_0 + \beta_1 \text{ESG} + \beta_2 \text{Size} + \beta_3 \text{Growth} + \beta_4 \text{Leverage} + \varepsilon \qquad (10)$$

Definition of variables are as shown in equation (1). For the one-year forecast horizon, only data from the travel and leisure industry sector had ESG as a statistically significant predictor ($p < 0.1$) as shown in Table 8. The adjusted r^2 is 0.485.

Variable	**Un-standardised coefficients**		**Standardised coefficients**	**t**	**p-value**
	β_i	**Std. error**	β_i		
(Constant)	-0.074	0.045		-1.645	0.126
ESG	**-0.001**	**0.000**	**-0.563**	**-1.947**	**0.075**
Size	**0.010**	**0.005**	**0.546**	**1.916**	**0.079**
Leverage	0.004	0.003	-0.367	-1.432	0.178
Growth	**-0.025**	**0.008**	**-0.807**	**-3.335**	**0.006**

Table 8. FERROR as dependent variable, one-year forecasts.

5. Conclusion and Future Research

An analysis of ESG scores of 208 companies in Australia across various industry sectors during the period 2008 to 2010 reveals that the oil and gas and the mining sectors achieved the worst ESG scores, while the banking and financial services achieved the best ESG score.

A strong positive link between financial performance and sustainability practices, as measured by ESG scores, could not be established looking at financial performance measures one at a time; a large majority of the regression coefficients fell below the 0.5 threshold suggesting weak correlation. From the multi-linear regression analysis, although a majority of the correlation coefficients are positive, only one measure of financial performance (EV model) shows ESG as being statistically significant. Both the 1-year and 2-year lag analysis could not convincingly demonstrate a strong correlation between financial performance and ESG. Many negative correlations were observed between financial performance measures and ESG score. From the portfolio analysis, both the stock return and the arithmetic return for the portfolio of ESG leaders are lower by comparison to the ESG laggards. This result however, should be interpreted with caution as the sample period examined in this paper falls during the global financial crisis. In the analyst forecast analysis, it was found that generally a negative association exists between the forecast error and ESG scores, however only the food and beverage sector and the travel and leisure sector showed statistically significant results, and only for one-year forecasts.

Consequently, hypothesis H1 advanced in this paper, namely that there is a link between financial performance and ESG scores, is rejected. However hypothesis H2, namely that ESG performance is negatively associated with analyst forecast errors, is mildly accepted because only the food and beverage sector showed statistically significant results for both one- and two-year forecast horizons, while only the travel and leisure industry sector had ESG as a statistically significant predictor in the multi-linear regression analysis.

There are a number of possible flow-on conclusions:

- Since financial performance has little to no correlation with ESG scores, the validity of the deductions stemming from stakeholder theory and Freeman and Evan (1990) (namely satisfying a non-conflicting multiple stakeholder interest, in this case socially responsible practices, actually does lead to sustained firm performance are in doubt.

- There could possibly be a blurring between certain ESG practices. That is, while some practices may be positively impacting a firm's profit, other practices may not necessarily be value-adding but rather only burdening the firm with additional cost.
- The impact of ESG on financial performance may not be able to be captured within a time frame of 1 and 2 years, requiring a longer period of study.
- The ESG scores may not reflect the true ESG practices of companies.
- The ESG reporting of companies may not allow the reader to fully comprehend those practices in order to score them objectively.

Future research. From the data analysed, it is observed that there is no strong positive or negative correlation between financial performance and ESG scores across all industry sectors except for the food and beverage industry sector. One of the reasons advanced for this is that the current framework for ESG reporting is not well developed and hence lends itself to a certain degree of subjectivity. Therefore, future research could look into improving the value relevance sustainability reporting. For example, the International Integrated Reporting Committee (IIRC) is developing a globally accepted framework that brings together environmental, social and governance (ESG) information with financial reporting in a clear, concise, consistent and comparable format.

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Appendix A
Dimensions used to evaluate ESG Scores

Environment (8)	**Social (11)**	**Governance (7)**
Environmental impact	Human rights overall	Board practice
Environmental policy	Supply chain exposure	Bribery risk exposure
Environmental management	Supply chain overall	Countering bribery overall
Environmental reporting	Positive products and services	Codes of ethics
Environmental performance	Stakeholder policy	ESG risk management
Climate change	Stakeholder systems	Responsibility for stakeholders
Greenhouse gases	Stakeholder engagement	Women on the board
Environmental solutions	Stakeholder reporting	
	Equal opportunities	
	Health & safety	
	Community involvement	

Notes: The above ESG dimensions are provided by EIRIS. The scoring mechanism uses an ordinal scale, where 3 represents a high positive and -3 represents a high negative. Each dimension is scored by EIRIS researchers using a question (series of questions) that is (are) relevant in assessing the practice of the company for that element. For example in evaluating the presence of "women on the board" dimension, none is rated "low negative" = -1, one or more women in the board but not 20% is "low positive" = 1, between 20% and 33% is "medium positive" =2 and more that 33% is "high positive" = 3. Then a sum score is obtained for each dimension. The ESG score used in this paper is a sum score for all 26 dimensions identified to be general indicators of ESG practices.

Appendix B. Financial performance formulae

Measure	Formula
Return on equity (ROE)	$\frac{\text{Net profit after tax}}{\text{Shareholders equity} - \text{Outside equity interest}}$
Return on assets (ROA)	$\frac{\text{Net profit after tax}}{\text{Total assets} - \text{Outside equity interests}}$
Return on invested capital (ROIC)	$\frac{\text{Net operating profit less adjusted taxes}}{\text{Operating invested capital before goodwill}}$
Earnings before interest tax depreciation and amortisation (EBITDA) margin	$\frac{\text{EBITDA}}{\text{Operating revenue}}$
Net operating profit less adjusted taxes (NOPLAT)	$\frac{\text{NOPLAT}}{\text{Operating revenue}}$
Earnings per share (EPS)	$\frac{\text{Net profit after tax} - \text{Preference dividends}}{\text{Average number of ordinary shares}}$
Dividend per share (DPS)	$\frac{\text{Ordinary dividends}}{\text{Number of ordinary shares}}$
Dividend yield (DY)	$\frac{\text{Dividend per share}}{\text{Market price per share}}$
Price to earnings ratio (PER)	$\frac{\text{Market price per share}}{\text{Earnings per share}}$
Market capitalisation to trading revenue ratio (MC/TR)	$\frac{\text{Market capitalisation}}{\text{Trading revenue}}$
Enterprise value (EV)	$\text{Common equity} + \text{Debt} + \text{Minority interest} + \text{Preferred equity} - \text{Cash}$
Price to book value (P/BV)	$\frac{\text{Closing share price}}{\text{Shareholders equity per share}}$